

8.3: Use and Abuse of Tests of Significance

- P-value - prob. of getting our sample
- o Tells us

- how much evidence against H_0

Ex: P-val: 0.00003 \rightarrow reject H_0
 $\alpha = 0.05$ P-val: 0.047 \rightarrow reject H_0

- o We report P-values so that

people can make own concl.
 \rightarrow in conclusions

- α Level

- Common levels: 0.01, 0.05, 0.10

- Smaller level=

- need more evidence to reject H_0 .
- need more extreme sample

- DO NOT

only use α -level as decisive
Use p-val too.

p-val: 0.049
0.051 > same

Ap exam - be decisive
use α

- Rejecting H_0

- o Use a small value of α .

$p_{val} = 0.03$ when decision is important

$$\alpha = 0.10$$

$$\alpha = 0.01$$

\uparrow importance $= \downarrow \alpha$

- o Look at the consequences-

of rejecting &
failing to reject.

$\alpha = \text{anything}$

- Conclusion/Decision

- o Take a practical look

@ both data & conclusion/decision

- Statistical Significance - rejected H_0

- o With large enough samples,

small changes in pop. register
as significant

- o The opposite is also true

small sample size,
big changes won't register

- o Caution:

just failing to reject H_0
doesn't mean that there's no info.

- o We can learn from tests that fail to reject H_0

take another sample w/ diff. hyp.

} more info =
easier to
detect changes

$$H_0: p = 0.20$$

$$H_a: p < 0.20$$

$$\hat{p} = 0.03 \leftarrow$$

$$0.10$$

$$0.17$$

$$0.19$$

$$n = 100$$

$$\hat{p} = 0.45$$

- Statistical Inference (conf. int & tests)
 - o Not valid on bad/small samples or bias data
 - o ALWAYS check assumptions

- Searching for Statistical Inference reject H_0
 - o Statistical Significance should mean something!
 - o Don't make the significance level after seeing data
 - o Don't test a hypothesis

After collecting data

$$\begin{aligned} \hat{p} &= 0.35 \\ H_0: p &= 0.60 \\ H_a: p &< 0.60 \end{aligned}$$